Questions (everyone)

4.6

Entire section

4.6

day 62

day 62

4.3|21) $f(x) = \tan^{-1}(x^2)$

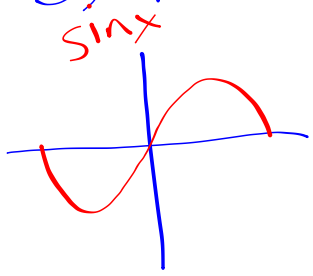
1) picture in my head of graph of $y = \tan^{-1}(x)$

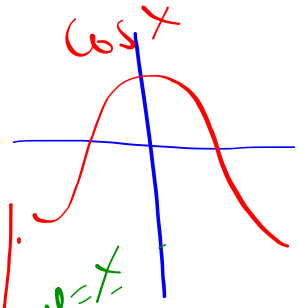
1DK

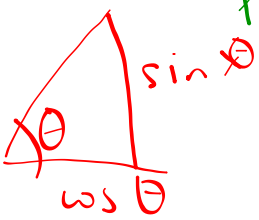
2) pic in my head of graph of $y = \tan x$

1DK

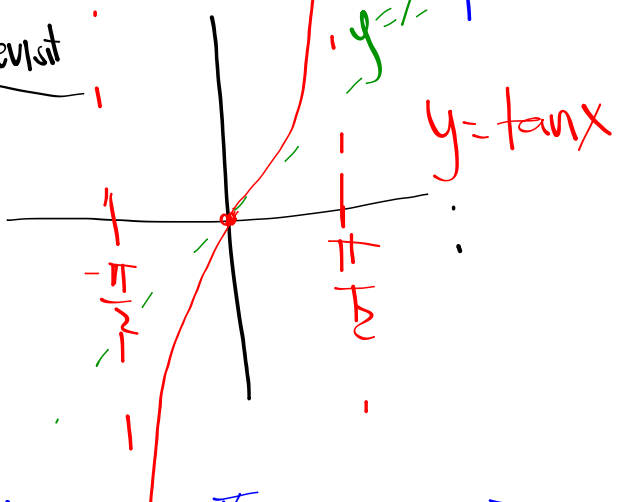
3) $\tan x = \frac{\sin x}{\cos x}$ ⟹ 1DK really have lots of catching up



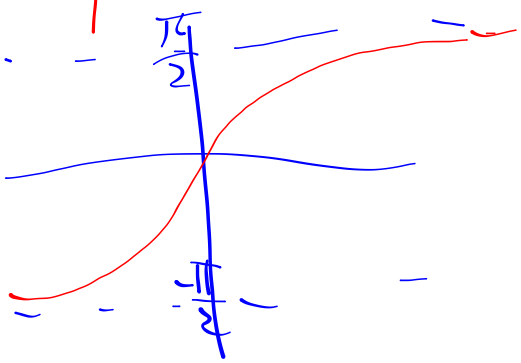




2 revisit



1 RV



day 62

4.3/21 9. $f(x) = \tan^{-1}(x^2)$

$\frac{d}{dx}(\tan^{-1}(x)) = \frac{1}{1+x^2}$

$f'(x) = \frac{1}{1+(x^2)^2} \cdot \frac{d}{dx}(x^2)$

$f'(x) = \frac{2x}{1+x^4}$

crit pts: $f'(x)=0$, $2x=0$, $x=0$; $f'(x)$ undf — No way Baby

$f''(x) = \frac{\frac{d}{dx}(2x)(1+x^4) - (2x)\frac{d}{dx}(1+x^4)}{(1+x^4)^2}$

$= \frac{2(1+x^4) - 2x(4x^3)}{(1+x^4)^2}$

$= \frac{2+2x^4-8x^4}{(1+x^4)^2} = \frac{2-6x^4}{\quad}$

ppoi: $f''(x)=0$, $2-6x^4=0$, $\frac{1}{3}=x^4$, $x=\sqrt[4]{\frac{1}{3}}$

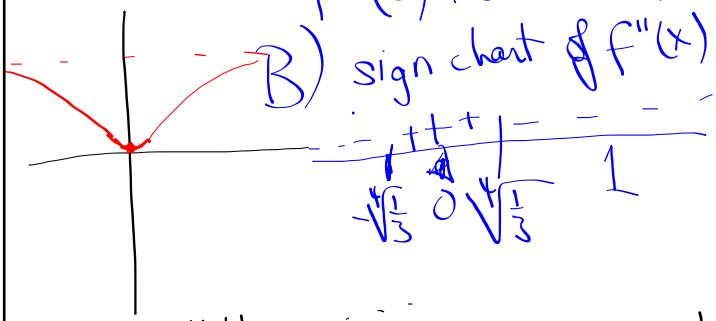
$f''(x)$ undf never

A) 2nd deriv test on $x=0$

$f''(0) = \frac{2-6(0)^4}{(1+0)^2} = 2$

$f''(0) > 0 \Rightarrow$ c-up $\Rightarrow$ rel min

B) sign chart of $f''(x)$



AHHHH - - -

I always check symmetry last because I'm dense + stupid.

Be like Arif

$f(x) = \tan^{-1}(x^2)$

$f(-x) = \tan^{-1}((-x)^2) = \tan^{-1}(x^2) = f(x)$

even fn symmetric about y-axis

Dec 2-7:23 AM

day 62

4.3/26) $f(x) = 2 - x^{2/3} + x^{4/3}$

$f'(x) = -\frac{2}{3}x^{-\frac{1}{3}} + \frac{4}{3}x^{\frac{1}{3}}$

$= -\frac{2}{3\sqrt[3]{x}} + \frac{4\sqrt[3]{x}}{3} = -\frac{2\sqrt[3]{x^2}}{3x} + \frac{4x\sqrt[3]{x}}{3x}$

$= \frac{-2\sqrt[3]{x^2} + 4x\sqrt[3]{x}}{3x}$

$f'(x) = 0$

$-2x^{2/3} + 4x^{4/3} = 0$

$2x^{2/3}(2x^{2/3} - 1) = 0$

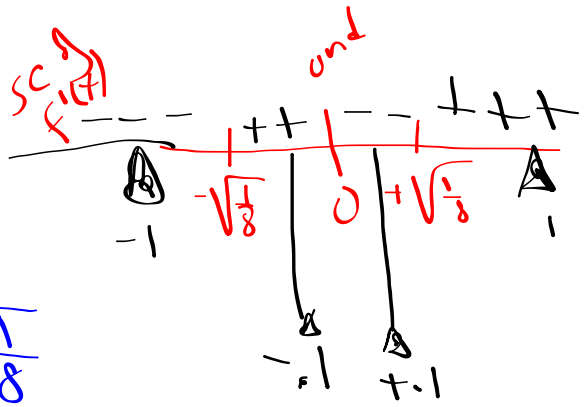
$x = 0$ or $2x^{2/3} = 1$

$x^{2/3} = \frac{1}{2}$

$x = \pm\sqrt{\frac{1}{8}}$

$f'(x)$ und

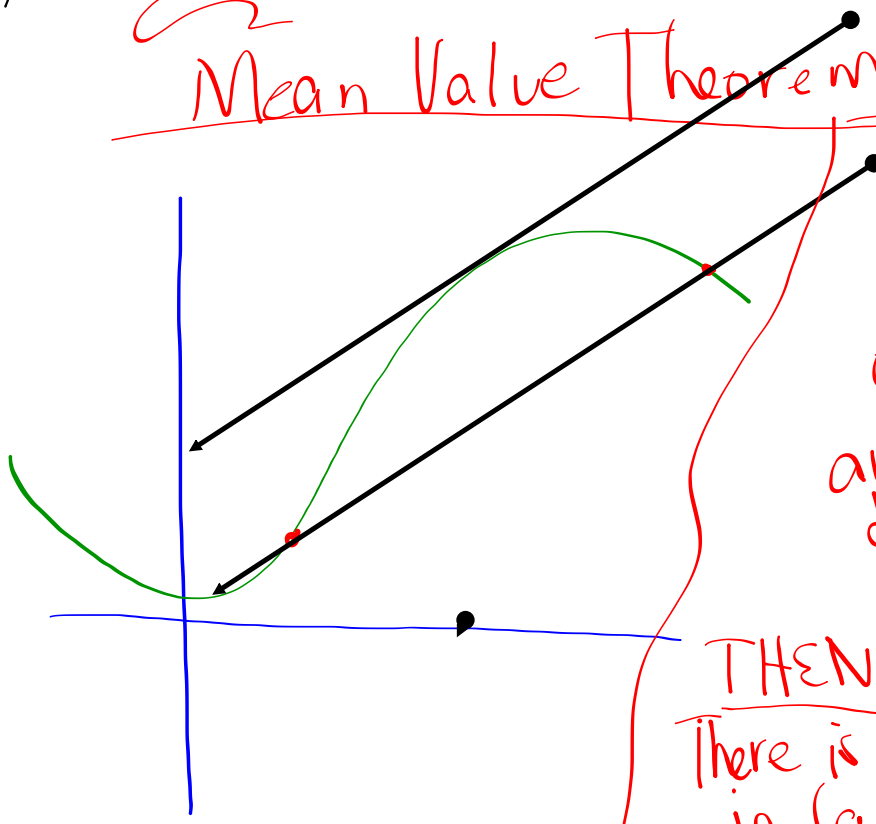
$x = 0$



4.6/ Very IMPORTANT

day 62

Mean Value Theorem



If $f(x)$ is continuous on $[a,b]$ and differentiable on (a,b)

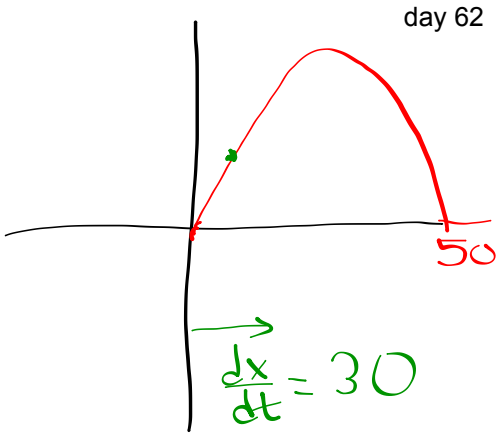
THEN

There is a c in (a,b) with $f'(c) = \frac{f(b)-f(a)}{b-a}$

Dec 2-7:23 AM

3.11 /40

$y = x(50-x)$



$y = 50x - x^2$

$\frac{dy}{dt} = 50\frac{dx}{dt} - 2x\frac{dx}{dt}$

$\frac{dy}{dt} = \frac{dx}{dt}(50-2x)$

a) when $x = 10$

$\frac{dy}{dt} = (30)(50-2(10))$

$= 900$